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Exploring fundamental properties of dense nuclear matter in the laboratory

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When the first high-energy heavy-ion beams became available about 40 years ago, experiments started to investigate the nuclear matter equation-of-state (EOS) at densities above saturation density. Since then, laboratory experiments with heavy-ions at GSI and AGS provided constraints on the high-density EOS, which are complemented by recent astrophysical observations. Further detailed information on the EOS is expected from future high-precision experiments at beam energies, where densities like in the core of neutron stars are transiently produced in the reaction volume. These laboratory measurements are also sensitive to the elementary degrees-of-freedom of strongly-interacting matter, which are expected to appear at high densities. Recent QCD-based calculations predict the emergence of a possible critical endpoint of a first-order chiral phase-transition from hadronic to quark-gluon matter at temperatures and baryon chemical potentials, which are covered by heavy-ion collisions at the future Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. The present status and the future perspectives of laboratory experiments exploring the fundamental properties of dense QCD matter will be discussed.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

Yes

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Session Classification: Heavy Ion Collisions and Critical Phenomena